Statement of Work

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We are planning to develop a surrogate system for E3SM/ELM with deep neural networks. Given Deep neural networks’ superior ability to handle scenarios not seen during the training, which can be achieved by proper data augmentation, it is expected to outperform traditional data mining approach. The trained surrogate system can serve for verification and prediction purpose.

The main challenge in this work is to design proper neural network architecture and data augmentation scheme. The former one decides how accurate the system is and the later one decides how well it can handle unseen scenarios during the training phase.

We are planning to develop a prototype for the surrogate system in 4 months (Jan 2017 – May 2017). We have the following tentative timeline for this project:

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| Analyze and study the patterns and correlations in the dataset | ~ 2 weeks |
| Implement prototype neural network for the surrogate system | ~ 1 month |
| Try various network architectures (recurrent neural network, reinforcement learning) with modifications to improve the performance | ~ 1 month |
| Design data augmentation scheme | ~ 1 month |
| Conclusion of the work and paper writing | ~ 2 weeks |